

Europäisches Patentamt  
European Patent Office  
Office européen des brevets



(11)

**EP 0 857 926 A1**

(12)

## EUROPEAN PATENT APPLICATION

(43) Date of publication:

**12.08.1998 Bulletin 1998/33**

(51) Int Cl.<sup>6</sup>: **F24J 2/52, H01L 31/042**

(21) Application number: **98200363.4**

(22) Date of filing: **06.02.1998**

(84) Designated Contracting States:

**AT BE CH DE DK ES FI FR GB GR IE IT LI LU MC  
NL PT SE**

Designated Extension States:

**AL LT LV MK RO SI**

(30) Priority: **06.02.1997 NL 1005204**

(71) Applicant: **Coöperatief Advies en**

**Onderzoeksburo u.a. Ecofys  
3533 HH Utrecht (NL)**

(72) Inventors:

- **Böttger, Willem Otto Julius  
1052 WK Amsterdam (NL)**

• **Schaap, Antonius Bernardus**

**1222 LN Hilversum (NL)**

• **Hoekstra, Klaas Jetze**

**3844 PS Harderwijk (NL)**

• **Schoen, Antonius Joseph Nicolaas**

**3522 JC Utrecht (NL)**

(74) Representative: **Duxbury, Stephen**

**Arnold & Siedsma,**

**Sweelinckplein 1**

**2517 GK Den Haag (NL)**

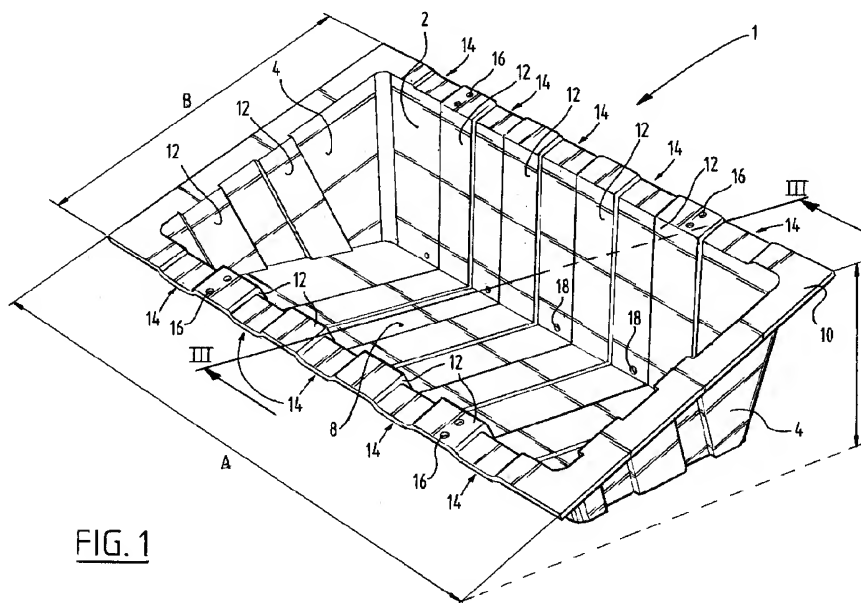
### (54) Device for supporting solar panel and a solar panel assembly comprising this device

(57) Device (1) for supporting one or more solar panels and/or thermal collectors which are arrangeable on a flat roof for example, comprising:

- a bottom wall (8),
- a rear wall (2) which extends upwardly from a rear

side of the bottom wall (8),

- two oppositely arranged side walls (4) which are integrally joined with side edges of the bottom wall (8) and rear wall (2), wherein the side walls (4) slope from the rear (2) wall to a front edge of the bottom wall (8), wherein the device is made of plastic.



**FIG. 1**

**EP 0 857 926 A1**

## Description

The present invention relates to a device for supporting one or more solar panels and/or thermal collectors, a solar panel assembly comprising this device and to a method for mounting one or more solar panels at a desired location, in particular on a flat roof of a building.

There is an increasing demand for the production of energy in an environmentally friendly manner.

The use of solar panels for transforming radiation energy from the sun into electrical energy is known. There are however practical problems involved in mounting such solar panels at a desired location.

An object of the present invention is to substantially obviate these problems.

According to a first aspect of the present invention there is provided a device for supporting one or more solar panels which are mountable on a surface, for example a flat roof, wherein the device comprises:

- a bottom wall,
- a rear wall which extends upwardly from a rear side of the bottom wall,
- two oppositely arranged side walls which are integrally joined with side edges of the bottom wall and side wall, wherein the side walls slope downwardly from the rear wall to a front edge of the bottom wall and wherein the device is made of plastic.

Since this device is lightweight, preferably weighing about 5 kg, and due to its functional design, the mounting time for mounting solar panels, especially on flat roofs, is drastically reduced with respect to the present mounting times. With the present invention it is for example possible to very simply manually arrange about 200 devices in a predetermined pattern on a flat roof in one day. This contrary to the mounting of known, concrete solar panel supports wherein a complete day is often needed to arrange one support on a flat roof.

Furthermore transportation of devices according to the present invention is very simple since these are able to be stacked, whereby a large number can be transported by freight in one journey to a desired location.

Accordingly a predetermined number of devices according to the present invention can be very quickly and efficiently mounted at a desired location, this providing a saving in man hours and costs.

Since the device according to the present invention only needs to be placed on a flat roof, further securing to the roof is not necessary whereby roof damage is kept to a minimum and complicated mounting profiles are not necessary.

The device according to the present invention is preferably made from recycled injection-moulded or vacuum-formed, chlorine-free polyethylene.

Injection-moulding and vacuum-forming provides an integral, independent device which is not very harmful to the environment. The device also provides protection

against UV radiation, the weather, is electrically insulating and can also be used as a cable channel.

The device furthermore has a long lifespan and requires little or no maintenance.

In order to efficiently support a solar panel, the upper walls of the rear wall and the side walls are preferably provided with nesting means which preferably take the form of a projecting lip part which preferably has a slightly larger circumference than that of a solar panel arrangeable on the device. Accordingly this lip part also functions as a buffer in order to protect the solar panel against knocks and the like.

The device is preferably provided with securing means for securing a solar panel, which securing means can comprise screw holes. Accordingly a solar panel can be secured to the device by means of screws which extend through the solar panel in order to be screwed into the screw holes of the device.

The side walls of the device preferably extend from the rear wall to the front wall at an angle of roughly 25° with respect to the horizontal in order to arrange the solar panel in an optimum position for receiving the sun's radiation.

The device can have one or more air channels arranged in the walls thereof in order to effectively cool the solar panels in order to keep the efficiency thereof at a maximum.

The device can have one or more drainage openings which are preferably arranged under in the rear wall for the drainage of moisture or condensation which can accumulate within the device.

In order to provide a very stable support the device can be provided with reinforcing elements which elements preferably take the form of thickened ribs being integral with the walls.

Furthermore the device can comprise one or more spacers, for keeping the device at a predetermined distance from a flat roof for example whereby a good mounting position of the device is provided and whereby possible damage to a flat roof is further reduced.

According to a second aspect of the present invention there is provided an assembly, comprising the above device and a solar panel arranged thereon. The assembly preferably further comprises stabilizing means which can be arranged within the device for stabilizing thereof at a desired location, which stabilizing means can comprise a number of standard concrete elements such as concrete tiles for example or grit, sand or the like. Accordingly the stability of the assembly according to the present invention can be arranged according to the mounting location thereof.

According to another aspect of the present invention there is provided a method for mounting one or more solar panels on a flat roof comprising the following steps;

- i) manually placing one or more of the above devices at a desired location in a predetermined pattern on a flat roof,

ii) mounting and securing of one or more solar panels on these devices.

The present invention will now be further described with respect to the figures, wherein:

figure 1 shows a perspective view of a preferred embodiment of the device according to the present invention;

figure 2 shows a side view of the device from figure 1;

figure 3 shows four assemblies according to the present invention arranged on a flat roof; and

figure 4 shows a side view of a second embodiment of an assembly according to the present invention.

A device 1 (figure 1) according to the present invention comprises a rear wall 2, two side walls 4, a front wall 6 (see figure 2) and a bottom wall 8.

The upper edge of the rear wall 2, side walls 4 and the front wall 6 are turned out in order to form a lip part 10 which extends outwardly from these walls 2-6.

The side walls 4 extend from the rear wall 2 to the front wall 6 at an angle of 25° with respect to the horizontal.

Reinforcing ribs 12 are arranged in the rear wall 2, the front wall 6 and the side walls 4 wherein these ribs have a breadth of 110 mm with a spacing of 110 mm, a depth of 15 mm and make an angle of 5° with the rear and side walls.

Air channels 14 on the rear wall 2 and the front wall 6 are to be found between these reinforcing ribs 12.

Screw holes 16 extend through the outer reinforcing ribs 12 of both the rear wall 2 and the front wall 6 whereby a solar panel 24 (see figure 3) can be secured to the device.

The dimensions of this preferred embodiment of the device 1 (are shown in figure 1 and figures 2a-l) are as follows.

A = 1350 mm	G = 110 mm
B = 730 mm	H = 300 mm
C = 380 mm	I = 240 mm
D = 110 mm	J = 15 mm
E = 110 mm	K = -30°
F = 135 mm	L = -5°

Condensation drainage openings 18 extend through the air channels 14 under in the rear wall 2.

Four assemblies 20 according to the present invention each comprise a device 1 from figure 1 and 2 and a solar panel 24 arranged thereon. These assemblies are shown mounted on a flat roof.

Concrete blocks 22 are placed in the interior of the device 1 (see figure 3) in order to provide extra stability. This preferred embodiment of the device 1 according to the present invention weighs about 5 kg.

Although an assembly according to the present invention is very suitable for arranging on flat roofs, it will nevertheless be clear that such an assembly can also be arranged on sloping roofs.

The device according to the present invention is extremely suitable for supporting solar panels with dimensions of about 1.30 x 0.70 m<sup>2</sup>, but the dimensions of the device according to the present invention can be chosen in order to support solar panels of other dimensions.

Instead of mounting solar panels in the manner as shown in figure 3, it is also possible to mount a solar panel or a thermal collector in the manner shown in figure 4. Here, the device 1 (figure 1-3) is placed upside down whereby the lip part 10 makes direct contact with a flat roof and whereby the device 1 is stabilized by means of concrete elements 22 placed upon the lip part 10. In this embodiment, the solar panel 24 is mounted on the lower side of the bottom wall 8.

The present invention is not limited to the above described preferred embodiments, the requested rights are rather determined by the following claims.

#### Claims

1. Device for supporting one or more solar panels and/or thermal collectors which are arrangeable on a flat roof for example, wherein the device comprises:
  - a bottom wall,
  - a rear wall which extends upwardly from a rear side of the bottom wall,
  - two oppositely arranged side walls which are integrally joined with side edges of the bottom wall and side wall, wherein the side walls slope downwardly from the rear wall to a front edge of the bottom wall, wherein the device is made of plastic.
2. Device according to claim 1, being injection-moulded or vacuum-formed from recycled polyethylene.
3. Device according to claims 1 or 2, wherein the upper edges of the rear and side walls are provided with nesting means for receiving a solar panel.
4. Device according to claim 3, wherein the nesting means comprise a lip part integrally jointed with the upper edges of the rear and side walls.
5. Device according to any of the preceding claims, further comprising securing means for securing a solar panel.
6. Device according to claim 5, wherein the securing means comprise screw holes.
7. Device according to any of the previous claims,

wherein the side walls extend downwardly to a front wall at an angle of roughly 25° with respect to the horizontal.

8. Device according to any of the previous claims, wherein one or more air channels are arranged in the rear and/or side walls. 5
9. Device according to any of the previous claims, further comprising one or more drainage openings. 10
10. Device according to any of the previous claims, further comprising reinforcing elements arranged in the walls. 15
11. Device according to any of the previous claims, further comprising one or more spacers for keeping the device at a distance from a flat roof for example. 20
12. Assembly comprising a device according to any of the previous claims and a solar panel and/or thermal collector mounted thereon. 25
13. Assembly according to claim 12, further comprising stabilizing means arranged in the device for stabilizing the assembly in position. 30
14. Method for arranging one or more solar panels and/or thermal collectors on a flat roof, comprising the steps of: 35
  - i) manually placing one or more of the devices according to claims 1-10 at a desired location on a flat roof in a predetermined pattern;
  - ii) mounting and securing of one or more solar panels on the devices. 40

45

50

55

60

65

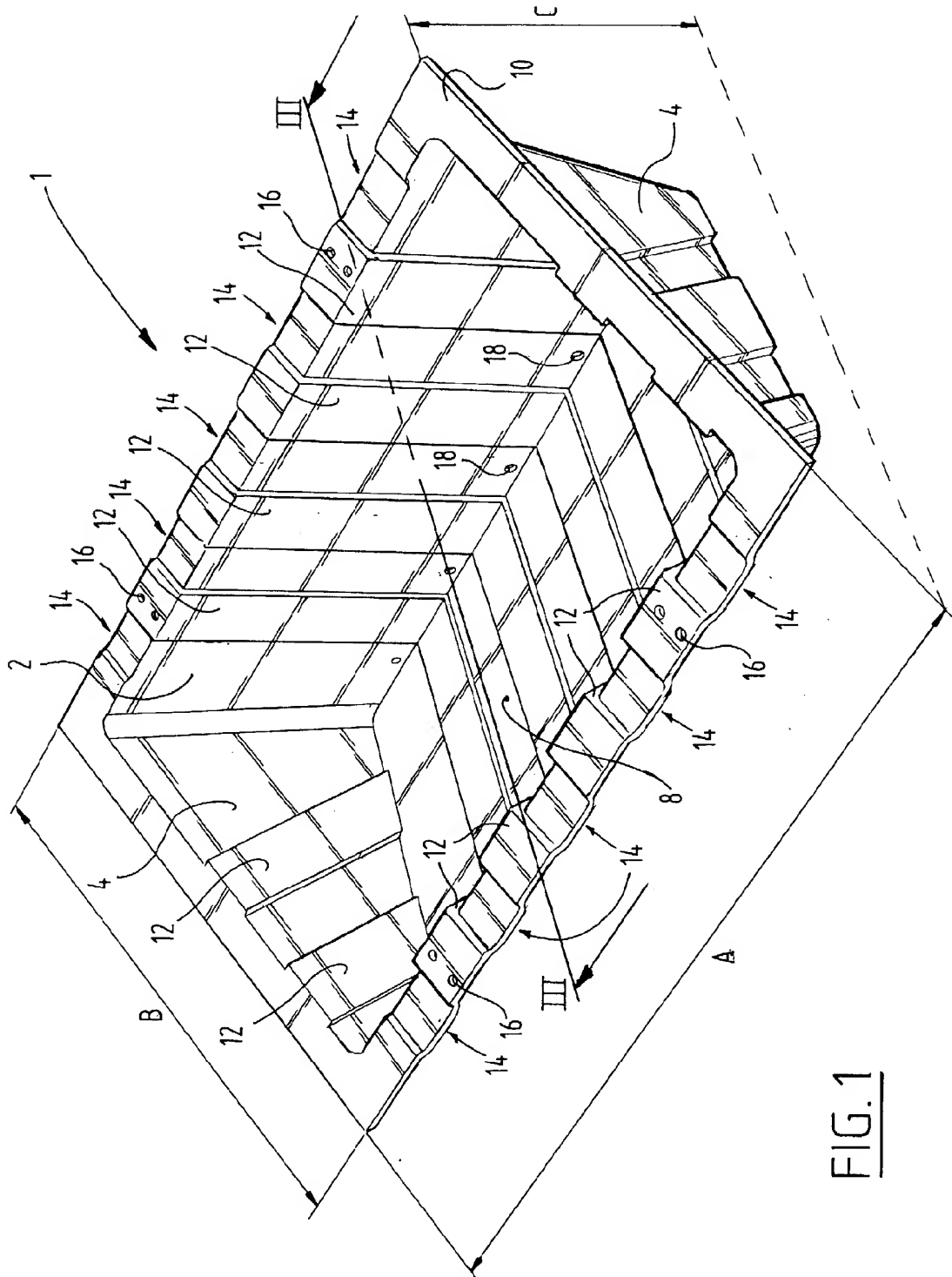


FIG. 1

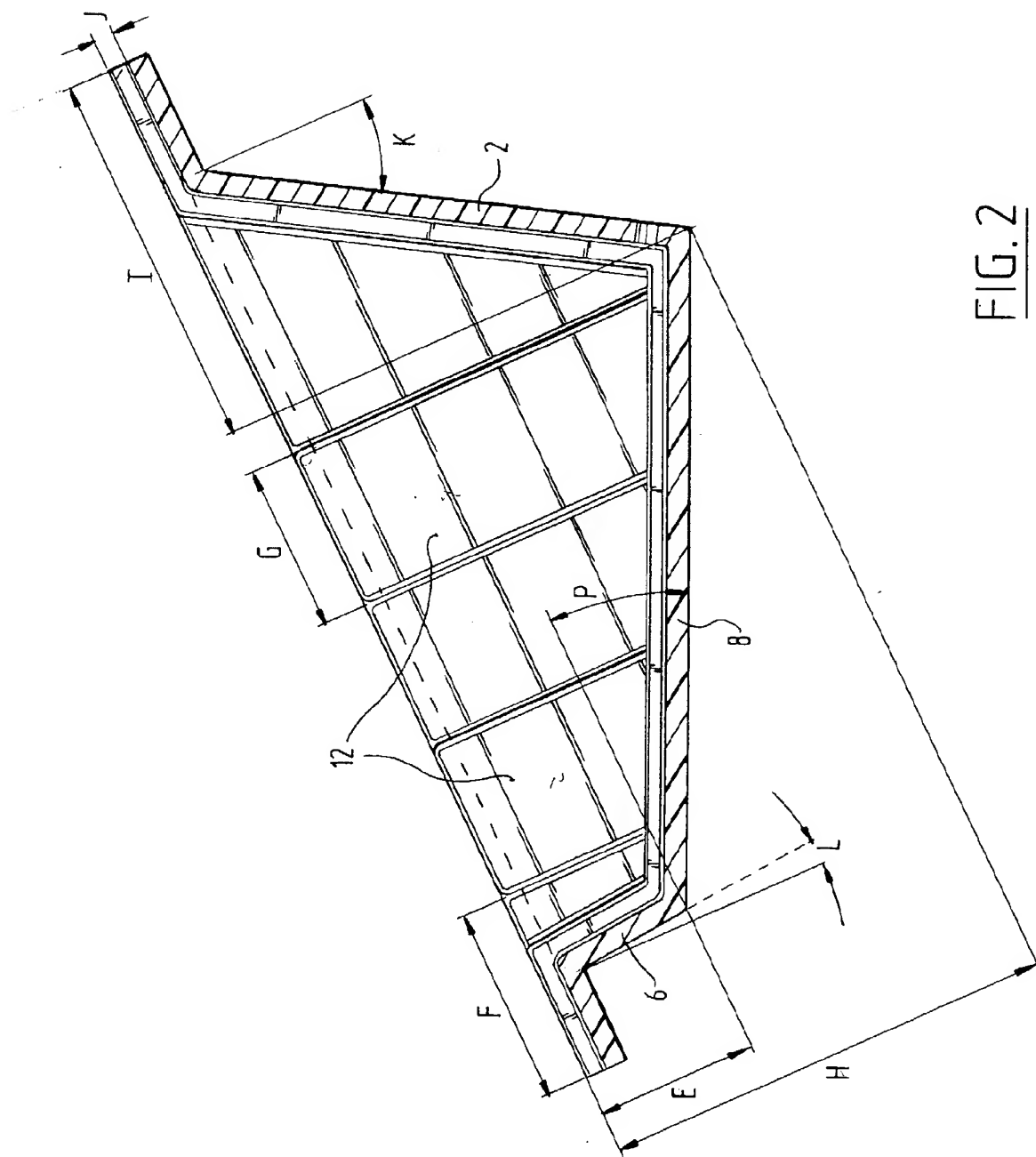


FIG. 2

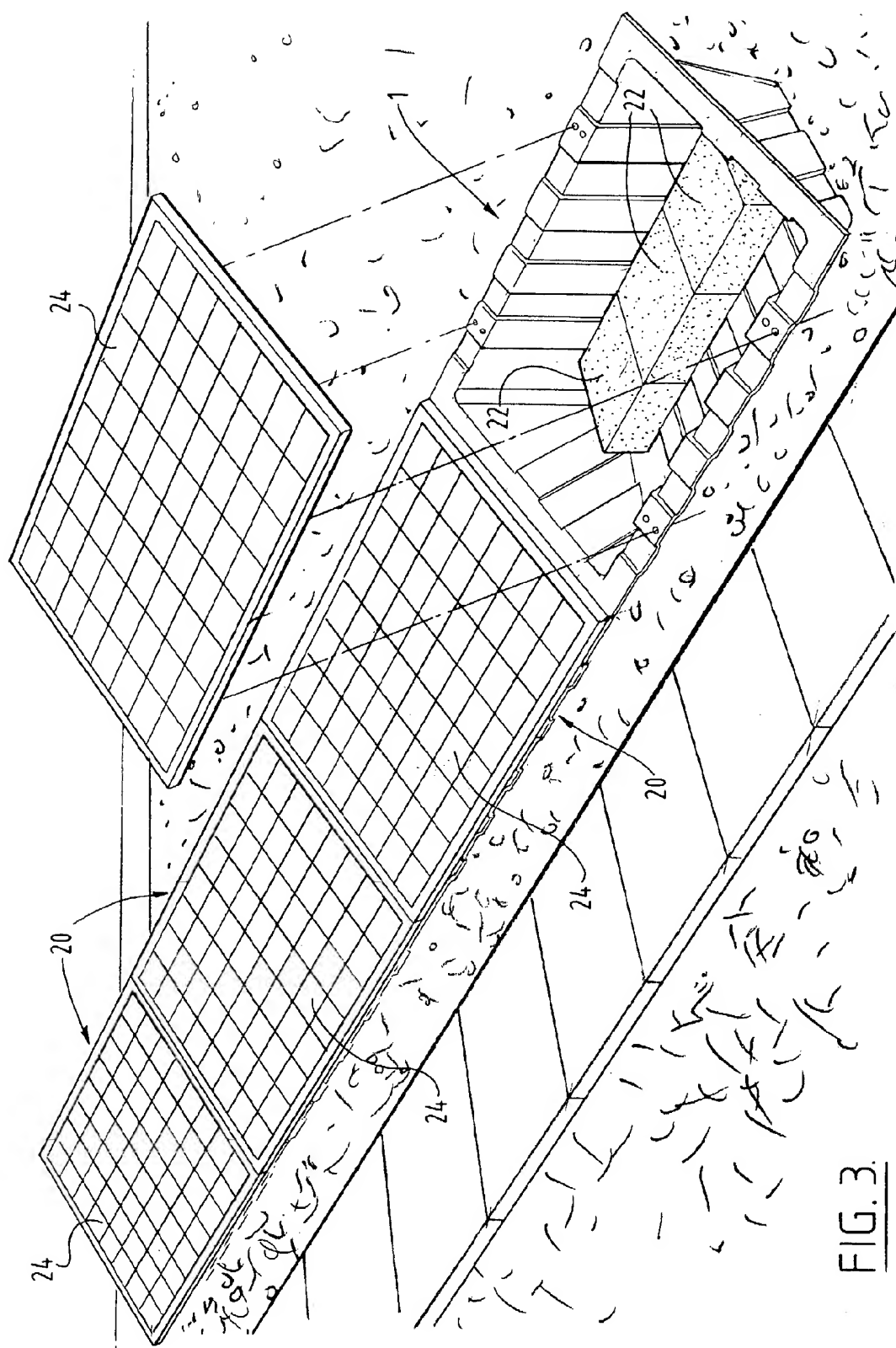


FIG. 3.

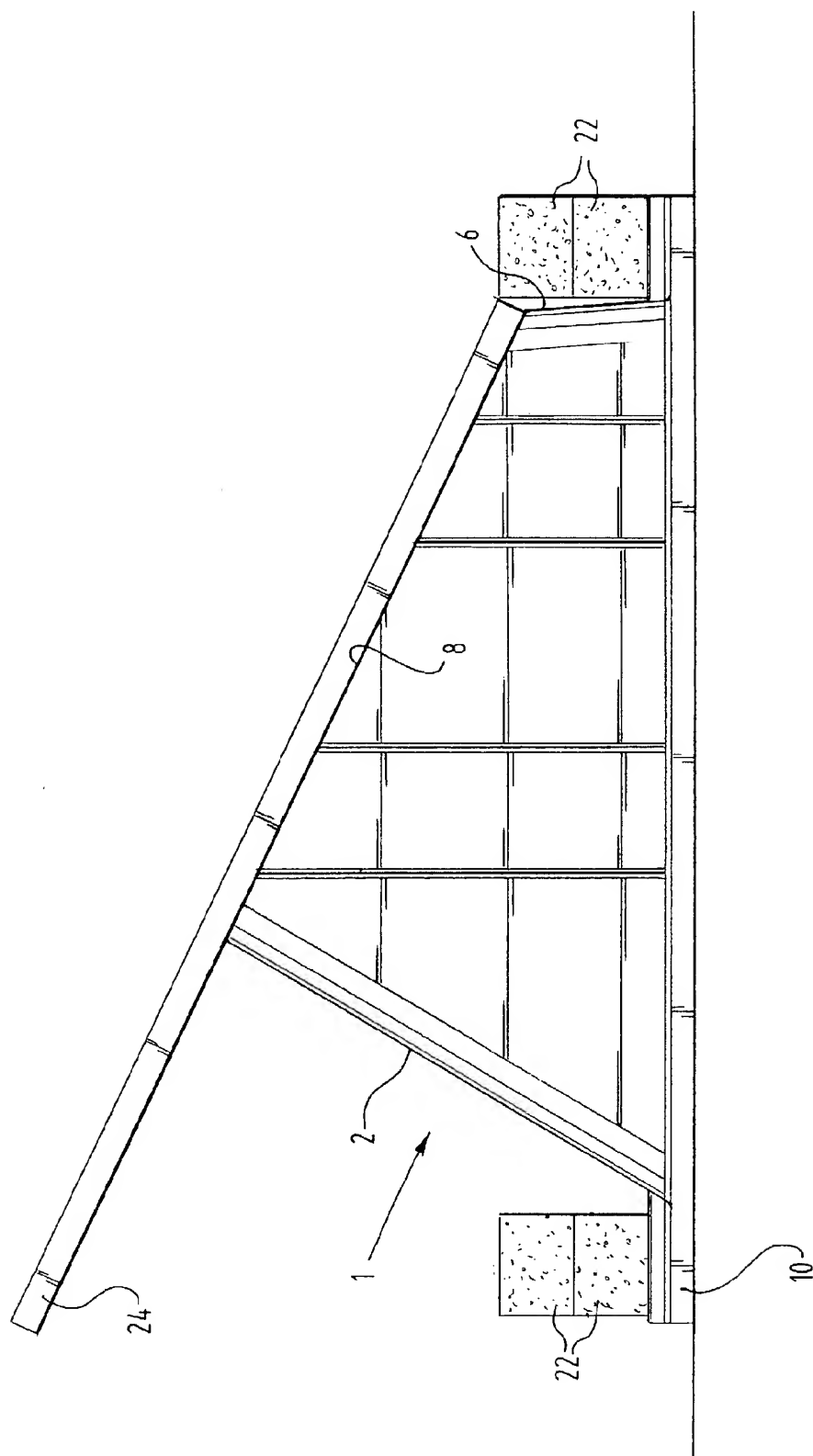


FIG. 4



European Patent  
Office

# EUROPEAN SEARCH REPORT

Application Number  
EP 98 20 0363

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
Y	US 4 378 006 A (HAWLEY) 29 March 1983 * column 1, line 60 - column 3, line 27; figures 1-5 *	1,9-14	F24J2/52 H01L31/042
A	---	3-6	
Y	FR 2 364 312 A (CACARDA GMBH) 7 April 1978 * page 1, line 1 - page 1, line 20 * * page 3, line 22 - page 4, line 34; figures 1-4 *	1,9-14	
A	---		
A	US 4 058 111 A (WENDEL) 15 November 1977 * column 2, line 26 - column 3, line 45; figures 1,2 *	1,3-7	
Y	---		
Y	DE 33 46 077 A (BM CHEMIE KUNSTSTOFF GMBH) 4 July 1985 * page 6, line 16 - page 8, line 13; figures 1-8 *	1-7, 12-14	
Y	---		
Y	EP 0 029 180 A (HOECHST AG) 27 May 1981 * page 3, line 36 - page 4, line 34; figure 1 *	1-7, 12-14	TECHNICAL FIELDS SEARCHED (Int.Cl.6)
A	---		F24J H01L
A	FR 2 463 370 A (SOCIÉTÉ FRANÇAISE DES PETROLES BP) 20 February 1981 * page 3, line 17 - page 4, line 16; figures 1-6 *	1-14	
A	---		
A	WO 89 02055 A (LUECKE NOMINEES PTY. LTD) 5 March 1989 -----		
The present search report has been drawn up for all claims			
Place of search <b>THE HAGUE</b>		Date of completion of the search <b>15 May 1998</b>	Examiner <b>Beitzung, F</b>
<p>CATEGORY OF CITED DOCUMENTS</p> <p>X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document</p> <p>T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons ..... &amp; : member of the same patent family, corresponding document</p>			

EPO FORM 1503 03.82 (P04001)